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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/673,761	09/29/2003	Laurent Lefebvre	00100.02.0046	1469

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EXAMINER

NGUYEN, HAU H

ART UNIT PAPER NUMBER

2628

DATE MAILED: 03/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/673,761	<b>Applicant(s)</b> LEFEBVRE ET AL.	
	<b>Examiner</b> Hau H. Nguyen	<b>Art Unit</b> 2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 09 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

***Response to Arguments***

1. Applicant's arguments, filed January 9, 2006 with respect to claims 1-25 have been fully considered and are persuasive. The rejections and objections of claims 1-25 has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Lindholm et al. (U.S. Patent No. 6,650,330) and Lindholm et al. (U.S. Patent No. 7,015,913). The indicated allowability of claims 5, 7, 17-19, 23, and 25 is withdrawn in view of the newly discovered references above. Rejections based on the newly cited references follow.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-4, 6-9, 11-13 are rejected under 35 U.S.C. 102(e) as being anticipated by Lindholm et al. (U.S. Patent No. 6,650,330) (hereinafter, Lindholm '330).

Referring to claims 1, 8, and 9, Lindholm '330 teach a graphics system and method for processing multiple independent execution threads wherein as shown in Figs. 4, 4A, and 4B, Lindholm '330 teach a method of executing multiple threads in the transform module 52 which is capable of processing 3 vertices in parallel via interleaving. The method starts by determining a current thread to be executed in operation 420. Next, in operation 422, an instruction

Art Unit: 2628

associated with a thread to be executed during a current cycle is retrieved using a corresponding program counter number (*an arbiter to retrieve a first command thread of the plurality of command threads*, and thus, implying *a reservation station having a plurality of command threads stored therein*). Thereafter, the instruction is executed on the graphics-processing module in operation 424 (*a command processing engine*). Since the graphics-processing module requires more than one clock cycle to complete the execution, a second code segment might be accessed per a second program counter immediately one clock cycle after the execution of the first code segment. The second program counter is associated with a second execution thread (*a second reservation station*), wherein each of the execution threads processes a unique vertex. After the execution of each instruction, the program counter 450 of the current execution thread is updated and the program counter of the next execution thread is called by module 458 in a round robin sequence to access an associated instruction (*updating the first command thread in the reservation station*) (col. 10, lines 7-49, and col. 11, lines 25-30).

In regard to claim 2, as shown in Fig. 14A, Lindholm '330 teach when the last vertex instruction is found, an end of sequence (EOS) signal might be asserted (col. 18, lines 28-35) (*a done flag activated after all commands with the command thread have been executed by the command engine*).

In regard to claim 3, Lindholm '330 teach the reservation station is a memory device (input buffer 400, Fig. 4), and the arbiter retrieves the first command thread based on a priority scheme (col. 16, lines 42-61).

As for claims 4 and 11, Lindholm '330 teach the arbiter retrieves a second command thread of the plurality of command threads stored therein; and the command processing

Art Unit: 2628

receiving the second command thread wherein the first command thread and the second command thread may be interleaved (col.10, lines 7-57).

As for claims 6 and 12, Lindholm '330 teach the command processing further comprising: an arithmetic logic unit (ALU) operably coupled to the arbiter such that the arbiter is capable of providing at least one of the plurality of command threads to the ALU (numeral 456, Fig. 4B, col. 11, lines 6-12).

In regard to claims 7 and 13, as cited above, the graphic processing module executes vertex instructions, thus, implying a vertex reservation station.

4. Claims 14-25 are rejected under 35 U.S.C. 102(e) as being anticipated by Lindholm et al. (U.S. Patent No. 7,015,913) (hereinafter, Lindholm '913).

Referring to claim 14, as shown in Figs. 2 and 4, Lindholm '913 teach a graphics processing system comprising a pixel reservation station 215 having a plurality of pixel command threads stored therein (col. 5, lines 20-30); a vertex reservation station 220 having a plurality of vector commands threads stored therein (col. 4, lines 35-54); an arbiter (instruction scheduler 430) coupled to the pixel reservation station and the vector reservation station (col. 9, lines 25-40); an ALU (execution unit 470, Fig. 4) operably coupled to the arbiter; texture engine 225 (Fig. 2) operably coupled to the arbiter wherein the arbiter retrieves a first selected command thread from one of the plurality of pixel command threads and the plurality of vector command threads and the arbiter thereupon provides the first selected command thread to the texture engine (col. 4, lines 62-67, and col. 5, lines 1-5).

Art Unit: 2628

In regard to claim 15, Lindholm '913 teach the arbiter retrieves a second selected command thread from one of the plurality of pixel command threads and the plurality of vector command threads and thereupon provides the second selected command thread to the execution unit 470 (col. 9, lines 25-57).

As for claim 16, Lindholm '913 also teach the first selected command and the second selected command are both provided to the execution unit 470 and may be interleaved (col. 13, lines 24-39).

In regard to claim 17, Lindholm '913 teach the first selected command (vertex command) may be eventually provided back to the thread control buffer 420 from where it was previously retrieved by the execution unit 470 (col. 5, lines 7-19, and col. 7, lines 23-27).

In regard to claim 18, Lindholm '913 teach the pixel reservation station includes a first pixel memory device storing a plurality of pixel state bits and a second pixel memory device storing a plurality of pixel status bits and the vector reservation station includes a first vector memory device storing a plurality of vector state bits and a second vector memory device storing a plurality of vector status bits (col.. 7, lines 30-42).

Referring to claim 19, Lindholm '913 teach each of the pixel command threads and vector command threads including a done flag (flag associated with a threads activated when all process instructions have completed execution) (col. 9, lines 60-67, and col. 10, lines 1-3). As shown in Fig. 2, Lindholm '913 teach the processed vertices output by Vertex Output Buffer 260 are received by a Primitive Assembly/Setup 205, which is then output to Raster Unit 210. The Raster Unit 210 performs scan conversion on samples, such as vertices (col. 5, lines 9-19) (*when done flag is activated in the vector command thread, the vector command is provided to a scan*

Art Unit: 2628

*converter*). Lindholm '913 further teach the processed samples are output from Pixel Output Buffer 270 (Fig. 2) to Raster Analyzer 160 (Fig. 1) (col. 5, lines 40-45) (*when done flag is activated in the vector command thread, the vector command is provided to a rendering backend*).

In regard to claims 20-22, as cited above, Lindholm '913 teach retrieving a first selected command and a second selected command wherein, the first command and the second command are interleaved (col. 13, lines 25-39), and providing the selected command to the execution unit 240 for performing the selected commands, wherein the second selected command is provided prior to the completion of the first selected command (col. 9, lines 25-36), and writing the first selected command thread to the first reservation station (pixel output buffer 270) if the first selected command is one of the plurality of first command threads (pixel commands), and writing the second selected command thread to the second reservation station (vertex output buffer 260) if the second selected command is one of the plurality of second command threads (vertex commands).

In regard to claim 23, Lindholm '913 teach the texture engine 225 is included in the execution unit 240 (col. 5, lines 1-3).

In regard to claim 24, as cited above, Lindholm '913 teach when all of the commands with the selected command thread have been executed, setting a done flag.

As for claim 25, which is similar in scope to claim 19, is thus rejected under the same rationale.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lindholm et al. (U.S. Patent No. 6,650,330) (hereinafter, Lindholm '330) in view of Lindholm et al. (U.S. Patent No. 7,015,913) (hereinafter, Lindholm '913).

Referring to claim 5, as applied to claim 1 above, Lindholm '330 teach all the limitations of claim 5, except that the command processing engine is a texture processing engine.

However, as also cited above, Lindholm '913 teach a graphics multi-thread processing system, wherein the command processing engine (execution unit 240) includes a texture engine.

Therefore, it would have been obvious to one skilled in the art to utilize the method as taught by Lindholm '913 in combination with the method as taught by Lindholm '330 in order to perform texture functions, such as texture mapping (col. 4, lines 60-67, and col. 5, lines 1-5).

In regard to claim 10, as cited above, Lindholm '330 teach the first reservation station is a memory device. Although Lindholm '330 do not teach the second reservation station is a FIFO, Lindholm '913 teach the reservation station can be a FIFO (col. 4, lines 35-39).

Therefore, it would have been obvious to one skilled in the art to utilize the method as taught by Lindholm '913 in combination with the method as taught by Lindholm '330 so that commands are stored and processed in their received order.



***Conclusion***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hau H. Nguyen whose telephone number is: 571-272-7787. The examiner can normally be reached on MON-FRI from 8:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kee Tung can be reached on (571) 272-7794.

The fax number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system contact the Electronic Business Center (EBC) at 866-2 17-9197 (toll-free).

H. Nguyen

3/22/2006

A handwritten signature in black ink, appearing to be 'K. M. Tung', written in a cursive style.

**Kee M. Tung  
Primary Examiner**